MINISTRY OF HEALTH
SCOTTISH HOME AND HEALTH DEPARTMENT

Report by the Working Party on Ambulance Training and Equipment

Part 2

Equipment and Vehicles

LONDON
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INTRODUCTION

The Right Hon. Kenneth Robinson, M P
Minister of Health

The Right Hon. W. Ross, M B E, M P
Secretary of State for Scotland

1. We presented Part 1 of our Report, which dealt with training, in November, 1965, and this was published in March, 1966.

2. Seven further meetings have been held, making a total of 25 meetings.

3. We have been able to add to the valuable information and suggestions which we received in evidence from the organisations and individuals listed at Appendix IX of Part 1 by means of two questionnaires, one on equipment and one on vehicles, which we addressed to ambulance authorities. In this way we obtained not only a detailed picture of the variety of equipment and vehicles used by ambulance authorities but also their assessment of the advantages and defects of what they were using and their views on the improvements which they consider necessary. While this information is too extensive to be attached to our Report we have made frequent reference to it and it is in the possession of the Ministry of Health for future reference. A digest is given at Appendix J. The information was studied by two groups which we set up, one on Equipment and the other on Vehicles, and this Report is based on their detailed work.

4. Most ambulance authorities and most of the organisations who gave evidence stressed the need for a greater degree of standardisation of equipment and there was considerable criticism of the existing vehicles used for stretcher patients. Although the reputation of certain products has led to widespread use of them we found that there were important items of equipment, such as stretcher gear and stretchers, in which there was little standardisation. In our view there is scope for an altogether greater degree of standardisation than exists at present. In the case of both equipment and vehicles we came to the conclusion that further study and research are still required before significant progress can be made; this underlines the importance of the Central Ambulance Services Council which we recommended in paragraphs 47 and 49 of Part 1 of our Report and we urge that this Council should be set up without delay.

5. We have been saddened by the death of Professor Pask, who made a great personal contribution to our work, and we were deeply sorry to lose the services of Mr. Griffith because of ill-health.

6. We would like to record our thanks to the Greater London Council for allowing Mr. J. D. Burton, and to the Society of Motor Manufacturers and Traders for allowing Mr. F. E. Denmee, to join in our consideration of ambulance vehicles. We could not have done our work without the benefit of their expert advice.

7. We are also grateful for the continuing efforts of our Secretary, Mr. H. Herzmark, assisted by Mr. H. W. S. Ward. We pay tribute to Mr. T. G. Mullen for the thought he has given to the problems confronting us and for having guided us through the extensive material resulting from our questionnaires.

8. We now have the honour to present Part 2 of our Report on the equipment and vehicles used in the ambulance service and thus complete our task. For ease of reference we open with a list of recommendations.

Signed E. L. M. Millar (*Chairman*)
J. K. Anderson
A. Crampton Smith
J. H. Daykin
Alexander Drummond*
Dillwyn Evans
W. S. Lewin
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N. A. Woodruff

H. Herzmark (*Secretary*)

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*Signed subject to the reservations contained in the Minority Report on page 30.

LIST OF RECOMMENDATIONS

1. There is scope for an altogether greater degree of standardisation than exists at present. (Paragraph 3).

2. The Central Ambulance Services Council and its Equipment Committee should undertake the study and research necessary to produce detailed specifications of equipment and vehicles considered most suitable for the ambulance service. (Paragraph 4).

3. The functions of the Council and its Equipment Committee with regard to equipment are set out. (Paragraph 5).

4. Padded and adjustable trolleys, which can also serve as seats for sitting patients, should be developed as the standard form of stretcher gear for ambulances. (Paragraph 9).

5. The scale of issue of these trolleys should be two per ambulance and no other stretcher gear or seats for patients would be required. (Paragraphs 9 and 14).

6. The pole and canvas stretcher should be the primary stretcher for use in the ambulance service. (Paragraph 11).

7. The scale of issue for each ambulance should be four poles, four canvases and four spreaders. (Paragraphs 11 and 14).

8. In services which do not yet use the pole and canvas type of stretcher a stretcher canvas should be placed on top of the more elaborate stretcher so that the patient can be lifted off at the hospital. (Paragraph 11).

9. Hospitals should have their own poles for this purpose and a supply of canvases to exchange with ambulance services. (Paragraph 11).

10. The Furley type of folding stretcher should be the secondary stretcher for the ambulance service. (Paragraph 12).

11. One Furley type stretcher should be provided on every emergency ambulance and a further supply should be held in reserve for major accidents. (Paragraphs 12 and 14).

12. The Council should work towards the development of a spreader capable of making a pole and canvas stretcher sufficiently rigid to enable the Furley type stretcher to be dispensed with. (Paragraph 12).

13. Stretchers should conform to B.S. No. 896 in dimensions and performance. (Paragraph 13).

14. There should be four scales for stretchers and other basic equipment, according to the use of vehicles, as set out in Appendix B. (Paragraph 15).

15. Where the recommended trolleys are not yet in use each emergency ambulance should carry two mattresses or the equivalent and at least two pillows; they should be washable, stain resistent and impervious. (Paragraph 16).

16. Blankets should be on the scale of six per emergency ambulance and should be of material sterilisable without deterioration. (Paragraph 16).

17. Blankets should be identifiable as ambulance service property, in which case stocks could be held at hospitals for interchange purposes. (Paragraph 16).

18. One carrying chair and sheet should be carried on emergency ambulances. Research is needed to find the best type to be used. (Paragraph 17).

19. Bedding should be warmed but care is needed in achieving this. (Paragraph 18).

20. Emergency ambulances should carry one bed pan with a disposable lining (and there is scope for investigation of types and materials to be used), one urine bottle, twelve disposable vomit bags, two bowls for general purposes, a feeding cup and a drinking water receptacle with disposable beakers. (Paragraph 19).

21. Provision should be made for suspending infusion apparatus on both sides of emergency ambulances in such a way that the containers remain in a vertical position without swinging. (Paragraph 20).

22. Further information is necessary to establish the best type of oxygen apparatus but in the meantime emergency ambulances should carry a bag and mask system (the mask should be of a transparent material which will cloud over with each expiration and attached to the bag by means of a joint capable of rotating through 360° as in the Norwegian type), a set of Guedel type airways and, at the discretion of the ambulance authority, two airways of the Brook type. (Paragraphs 22 and 23).

23. Emergency ambulances should carry an oxygen cylinder and its associated equipment. (Paragraph 23).

24. Suction apparatus of adequate power to remove vomit should be carried on emergency ambulances. (Paragraph 23).

25. A mixture of carbon dioxide and oxygen should not be carried in addition to oxygen. (Paragraph 24).

26. One set of splints should be carried on emergency ambulances, its composition being left to the discretion of ambulance authorities. (Paragraph 25).

27. Inflatable splints should be carried and staff trained to use them. Further research is needed. (Paragraph 27).

28. Two waterproof sheets should be carried on emergency ambulances. (Paragraph 28).

29. Two burns sheets should be carried on emergency ambulances. They should be sterile and measure 3 ′ × 4 ′. (Paragraph 29).

30. A hand lamp should be provided for each member of the ambulance crew. It should be capable of being clipped on to the uniform and of standing on the ground. (Paragraph 30).

31. A sterile maternity pack should be carried on emergency ambulances and all the recommended items should be in individual sterile packs. (Paragraph 31).

32. One set of manifold stretcher harness should be carried on emergency ambulances. (Paragraph 32).

33. Six pairs of disposable gloves and one pair of insulated gloves conforming to and tested in accordance with B.S. No. 697 should be carried on emergency ambulances. In areas where there are live rails one pair should be carried in each first aid satchel. (Paragraph 33).

34. Emergency ambulances should carry a dispenser containing large, disposable paper tissues. (Paragraph 34).

35. Emergency ambulances should carry disposable bags for used dressings and tissues. (Paragraph 34).

36. A deodorant spray should be carried on emergency ambulances. (Paragraph 34).

37. There is a need to take the arrangements of the hospital service into account when deciding on ambulance equipment. (Paragraph 35).

38. Certain items should be standardised to facilitate interchange between hospitals and ambulances. (Paragraph 35).

39. The Council should consider the possibility of co-ordinating and cataloguing the whole range of equipment used by the ambulance and hospital services. (Paragraph 35).

40. A first aid satchel should be available to each member of the ambulance crew. (Paragraph 36).

41. Emergency ambulances should carry a dressings case. (Paragraph 36).

42. Ambulances should not carry poison antidotes. (Paragraph 38).

43. Surgical instruments and plasma should not be carried. (Paragraph 39).

44. In general pain-relieving drugs should not be carried. (Paragraph 41).

45. The following further items should not be carried as standard items of equipment:—

Ground sheet
Neil Robertson stretcher*
Fracture boards
Sand bags
Thomas splint
Contour splinting plaster of Paris*
Stretcher cover
Constrictive bandages or tourniquets
(Paragraph 43)

46. Fixed washing bowls are desirable but not essential. (Paragraph 43).

47. Simple rescue equipment should be carried on emergency ambulances. (Paragraph 44).

48. All items of rescue equipment, apart from the fire extinguisher, should be carried in a locker which opens from outside the vehicle. (Paragraph 44).

49. Provision should be made to convey to the scene of a major accident adequate quantities of both normal ambulance and rescue equipment. (Paragraph 45).

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*To be available in particular circumstances.

50. Only items of immediate use in the rescue of lightly trapped patients and items for clearing the path of ambulances should become standard ambulance service equipment. (Paragraph 45).

51. The equipment for major accidents should be made up into standard packs and these should be held in readiness at selected supply points. (Paragraph 45).

52. At these points the equipment should preferably be loaded on its own vehicle, which should have four-wheel drive. (Paragraph 45).

53. The area to be served by each supply point should be chosen according to the degree of urbanisation and the degree of risk. (Paragraph 46).

54. It should be possible to bring the equipment to the scene of a major accident within 15 minutes in highly urbanised and high risk areas and within 30 minutes in other areas. (Paragraph 46).

55. An ambulance control vehicle with radio-telephone is essential for major accidents. It should have an illuminated identification symbol to be standardised by the Council. (Paragraph 47).

56. For journeys by rail or air the escort should have all necessary equipment to hand. (Paragraph 48).

57. The items of equipment for rail or air journeys should be made into packs. (Paragraph 48).

58. All grades of the ambulance service should be provided with full uniform and a standard uniform for all ambulance services is favoured. (Paragraph 49).

59. The Council should look into the question of uniforms specially designed for the various ranks of ambulance staff. (Paragraph 49).

60. Whilst in uniform all ambulance men should always have some simple first aid pack immediately available. (Paragraph 49).

61. The rank of ambulance men should be designated by insignia and the suggested ranks are listed. (Paragraph 50).

62. Ambulance services need not have protective clothing, respirators or equipment for dealing with accidents involving radioactive materials (Paragraph 55).

63. Items of equipment on the scale recommended should be held in readiness for ambulance crews called upon to deal with smallpox cases. (Paragraph 56).

64. Disinfection equipment or arrangements for carrying out disinfection of ambulances used for smallpox cases must be readily available. (Paragraph 56).

65. Recommended items of equipment for other infectious diseases should be available as necessary. (Paragraph 57).

66. Research and field trials are necessary to evaluate control equipment. (Paragraph 59).

67. The Council should advise on the co-ordination of ambulance service radio schemes and on linking them with hospitals. (Paragraph 61).

68. The Ministry of Health should discuss with the G.P.O. long term plans for improving radio communications. (Paragraph 61).

69. Thought should be given to miniature sets capable of being carried on the men themselves so that they can maintain contact with ambulance control when away from the vehicle. (Paragraph 61).

70. Portable incubators should be held at selected ambulance stations. (Paragraph 62).

71. The Council should promote the clarification of procedures governing the use of portable incubators and the standardisation of equipment, especially electrical connections. (Paragraph 62).

72. Four types of ambulance vehicle will be needed. (Paragraph 65).

73. Sitting patients should be carried whenever possible in forward or rear facing seats. (Paragraph 69).

74. The question of exempting from purchase tax sitting case ambulance vehicles without their being adapted to carry a stretcher patient should be taken up with the Board of Trade. (Paragraph 69).

75. Modifications to ambulance vehicles by ambulance authorities should be agreed in advance with chassis manufacturers and body builders. (Paragraph 72).

76. The Council should be given the means to sponsor the kind of research project necessary to evolve a suitable vehicle for stretcher patients. An outline specification is given in Appendix I. (Paragraph 77).

REPORT ON EQUIPMENT AND VEHICLES

General considerations

1. The Ministry of Health issued advice in Circular 51/50 relating to scales of equipment of the ambulance service and in Circular 12/62 the Ministry also issued advice on the safety requirements to be incorporated in the construction of ambulance vehicles. Each authority has been free to obtain whatever items of equipment and whatever kind of vehicle it considers best suited to its needs. There are many firms who make items of equipment suitable for use by the ambulance service or who produce items specially for the service and over the course of time a wide variety of such items has become available from which local health authorities have been able to choose. While only a small number of firms manufacture chassis used for ambulances for stretcher patients, a larger number provide bodies for these chassis and various kinds of car and personnel carrier are used. Consequently the equipment and vehicles now in use differ considerably between authorities.

2. The Report of the Sub-Committee of the Standing Medical Advisory Committee on the Accident and Emergency Services (referred to in this Report as the Platt Report) recommended that standards of equipment generally should be improved and brought up to those already achieved by the best authorities. It was therefore decided to ask the Scottish Ambulance Service and local health authorities in England and Wales to supply information about the equipment and vehicles in use in their services and to report on their degree of efficiency. This information was studied together with the suggestions made by the bodies and individuals from whom we received written evidence. The material proved of great value in the consideration of this subject.

3. Whilst it is accepted that standardisation for its own sake is to be deprecated and the exercise of ingenuity and experiment encouraged, we consider that a greater degree of standardisation than exists at present is required and could be achieved. This is necessary to ensure that equipment is interchangeable and to enable all to benefit from improvements in design. When several ambulance authorities serve one hospital or, as may happen, attend a major accident, the recovery of equipment from the hospital and the smooth transfer of patients within the hospital would be facilitated if all services used standard items. The training which we propose could benefit from a greater degree of standardisation of equipment and vehicles, inasmuch as techniques which new entrants learn at their training school would not then have to be related to the differing equipment and vehicles used in their respective services.

4. Throughout our discussions we appreciated that lists of items as such can be of only limited usefulness to ambulance authorities. We realised that, if a contribution to efficiency and standardisation is to be made, a detailed specification is needed of the article or vehicle considered most suitable. In most cases this would require further study and sometimes extensive research, which could be accomplished more appropriately by a standing body, for example, the Central Ambulance Services Council and its Equipment Committee, which we recommend in paragraphs 47 and 49 of Part 1 of our Report published on 7th March, 1966.

5. We expect the Council, assisted by its Equipment Committee, to have the following functions with regard to equipment:—

(*a*) to co-ordinate the work done by individuals and particular bodies;
(*b*) to set out detailed specifications;
(*c*) to standardise items of equipment where interchangeability is required;
(*d*) to offer advice on new equipment as it becomes available;
(*e*) to promote research, including field trials.

6. Apart, therefore, from our recommendations on stretcher gear and stretchers and on vehicles, we have for the most part confined our recommendations to drawing up lists of items of equipment that should be available for certain purposes. The main items on which we have made recommendations are:—

A. Stretcher gear and stretchers
B. Other basic equipment for ambulance vehicles
C. Contents of first aid satchels and dressings case
D. Items not considered necessary for inclusion in B and C above
E. Rescue equipment
F. Major accident equipment
G. Equipment for journeys by rail or air
H. Uniform and insignia
I. Radiation risk equipment
J. Equipment for infectious diseases
K. Control equipment
L. Radio equipment
M. Portable incubators
N. Vehicles.

7. In paragraphs 37 to 43 we recommend, with reasons, that certain items of equipment should not be carried on ambulances. Many of these, such as surgical instruments and pain-relieving drugs, and other items, such as infusion apparatus, may in certain exceptional circumstances (e.g. when casualties are trapped) have to be taken to the scene of an accident by a surgical and nursing team. We would expect that as an essential part of the accident and emergency services of the area envisaged in Hospital Memorandum (63)40 the appropriate hospitals would be prepared to send such a team out immediately if informed of the circumstances by ambulance controls; in country districts one of a panel of general practitioners may be the person to summon to the scene. There are in use at the present time a few vehicles carrying special equipment and personnel for dealing with patients suffering from coronary thrombosis and those requiring hyperbaric oxygen administration. These are still in the stage of being assessed as to their value and this Report does not concern itself with them.

A. STRETCHER GEAR AND STRETCHERS

8. In the evidence we received, including answers from ambulance authorities to our questionnaires on equipment and vehicles, there were more and stronger pleas for the standardisation of these than of any other items. For this reason and also because they are fundamentally important to patients, ambulance crews, training, procedure at hospitals and the design of vehicles, we gave special consideration to these items. This included a demonstration by ambulance officers and ambulance crews of the use of the main types of stretcher gear and stretchers. A summary of our findings is given in Appendix A.

Stretcher gear

9. This term usually means the support or bed on which a stretcher is placed during an ambulance journey, but it may also include mechanical devices to facilitate the loading and unloading of stretchers into and out of ambulances. For the reasons which are set out in detail in Appendix A, we consider that padded and adjustable trolleys, which can also serve as seats for sitting patients, should be developed as the standard form of stretcher gear for ambulances. The scale of issue would be two per ambulance and no other stretcher gear or seats for patients would be required in an ambulance. We hope that the Council would give urgent consideration to the development and standardisation of these trolleys.

Stretchers

10. Answers to the questionnaire on vehicles showed that there are some fifty different types of stretchers at present in use in the ambulance service and sixty-two variations of how many and of what kinds should be carried per ambulance. Such variety creates difficulty when patients have to be transferred from one ambulance to another and delays ambulances at hospitals since interchange with hospital equipment is only rarely possible. There have thus been many requests for a much greater degree of standardisation of stretchers.

11. The ideal requirements for a stretcher are that it should be comfortable for patients, light but durable, easily washed and disinfected, interchangeable between ambulances and between the ambulance service and hospitals, manoeuvrable in confined spaces and rigid enough for all ambulance purposes. Its design should also ensure that patients can be taken in and out of ambulances and moved within the hospital system with the minimum of disturbance. Apart from the rigidity required in certain circumstances (see paragraph 12 below), we consider that the pole and detachable canvas stretcher fulfils these requirements; it also meets the recommendations in the Platt Report that stretcher patients should always be left at hospitals on stretcher canvases and that ambulances should not have to wait at hospitals for the return of their stretchers. We, therefore, consider that the pole and canvas stretcher should be the primary stretcher for use in the ambulance service and that the scale of issue should be four poles and four canvases and four spreaders* per ambulance. In services which do not yet use the pole and canvas type of stretcher we recommend that a stretcher canvas should be placed on top of the more elaborate stretcher so that it can be taken off with the patient by the use of poles on arrival at the hospital. Hospitals should have their own poles for this purpose and a supply of canvases to exchange with ambulance services. In this way stretcher patients will be moved more easily from one part of the hospital to another and ambulances will no longer have to wait at hospitals to recover their stretchers.

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*Spreaders (also known as traverse irons) are attachments which can be fitted transversely to the poles to keep them apart and also act as legs to keep the canvas off the ground.

12. We recognise that a stretcher capable of being made rigid may sometimes (but infrequently) be required, especially when recumbent patients have to be carried longer distances over rough ground. The best known stretcher of this kind is the Furley type of stretcher which has been in use for many years. We also consider that such a rigid type of stretcher, which could serve as a temporary bed, is desirable for recumbent patients who may have to wait on stretchers at the road-side or at the scene of a major accident. At present spreaders used with poles and canvas can meet the need in some circumstances but cannot produce the degree of rigidity required in others. We therefore consider that for the time being the Furley type of folding stretcher should be the secondary stretcher for the ambulance service, that one should be carried on every emergency ambulance and that a further supply should be held as a reserve for major accidents (see paragraphs 45, 46 and Appendix E.). We recommend however, that the Council should stimulate the development of spreaders capable of making a pole and canvas stretcher sufficiently rigid to enable the Furley type stretcher to be dispensed with as a piece of equipment carried by an ambulance.

13. Whilst stretchers should conform to B.S. No. 896 in both dimensions and performance, we consider that within these limits there is scope for the Council to promote a standard pattern using modern lightweight and hygienic materials.

14. We recommend therefore:—

All ambulances of Types I and II (see paragraph 65 below)

2 stretcher trolleys per ambulance
4 stretcher poles per ambulance
4 spreaders per ambulance
4 stretcher canvases per ambulance

Additional for accident and emergency ambulances

1 Furley type stretcher per ambulance.

B. OTHER BASIC EQUIPMENT FOR AMBULANCE VEHICLES

15. We recommend four scales for stretchers and other basic equipment according to the use of vehicles, and these are set out in Appendix B. We discuss below primarily equipment for emergency ambulances set out in Scale A of this Appendix. The list of items that we recommend for ambulances on accident and emergency work does not differ markedly from what was recommended in Circular 51/50 except that suction apparatus (aspirator) has been added.

Bedding

16. Where the trolleys we recommend in paragraph 9 above are not yet in use, we recommend that emergency ambulances should carry 2 mattresses or the equivalent and that such ambulances should also carry a minimum of 2 pillows. These should be washable, stain resistant and impervious. Blankets should be on the scale of 6 per emergency ambulance, of material sterilisable without deterioration and identifiable as ambulance service property, in which case stocks could be held at hospitals for interchange purposes. It is known that at present a wide variety of types and colours of blankets are in use and research may be necessary to determine the best types for use in the ambulance service.

Carrying chairs and sheets

17. We recommend that one each of these items should be carried on emergency ambulances. There are many varieties, including a dual-purpose stretcher/carrying chair, and we consider that research is needed to find the best type to be used.

Means of bed warming

18. In our view bedding should be warmed for the patient's comfort but care is needed in this. If electric blankets are used they should be switched on in advance and removed or switched off before the patient is put in the bed. Similarly, if hot water bottles are used they should be placed inside the bedclothes in advance and removed when the patient is put in the bed; as an additional safety precaution covers should be used. Bed warming is clearly of less importance if the ambulance interior as a whole is warmed. There are various methods available for achieving this such as car heaters, oil fired heaters and electric storage heaters but care must be taken that the ambulance is not overheated.

Items for patients' personal use

19. Whilst we recommend that one bed pan with disposable linings and one urine bottle should be carried on emergency ambulances we consider that there is scope for investigation into the most suitable types and materials to be used. These vehicles should also carry 12 disposable vomit bags (which are to be preferred to vomit bowls), two bowls for general purposes, a feeding cup and a drinking water receptacle with disposable beakers; a vacuum flask is valuable.

Infusion apparatus

20. We recommend that provision be made for suspending infusion apparatus on both sides of emergency ambulances. The fixtures should be such that the containers remain in a vertical position without swinging.

Resuscitation equipment (respiration)

21. For resuscitation the first consideration is immediacy. The mouth to nose or mouth to mouth method fulfils this criterion and can be continued for any length of time (the help of an airway of the Brook type is not required, though some ambulance authorities prefer to use this kind of airway for aesthetic reasons) but a bag and mask system of inflating the lungs should be used as soon as possible. A plastic airway of the Guedel type may help to maintain unobstructed respiration. This type of airway may also be appropriate for unconscious patients who are breathing spontaneously.

22. We are aware that many different kinds of oxygen resuscitation apparatus are available from simple sets to complicated automatic resuscitators and consider that further information is necessary to establish the best type of apparatus. This is yet another example of a study which the Council might undertake.

23. In the meantime we recommend that ambulances would be adequately equipped for emergency purposes if they carried a bag and mask system through which, if necessary, oxygen can be given (the mask should be made of transparent material which will cloud over with each expiration and attached to the bag by means of a joint capable of rotating through 360° as in the Norwegian type), a set of Guedel type airways, and, at the discretion of the ambulance authority, two airways of the Brook type. In addition, such ambulances should carry an oxygen cylinder and its associated equipment. A good suction apparatus (aspirator) of adequate power to remove vomit should also be carried.

24. While we recognise that the Medical Research Council has recommended the use of a mixture of 7% carbon dioxide with oxygen for first aid treatment in cases of carbon monoxide poisoning, we consider that ambulances should not carry this mixture in addition to oxygen because the conditions in which it may have an advantage over oxygen are few and becoming fewer and because ambulance men should not in our view have to make this therapeutic decision.

Splints

25. Splints and the necessary padding should be carried on emergency ambulances but we do not feel able to make a firm recommendation as to the type to be used. There is a large number of types and scales of equipment carried on ambulances and there is no accepted way of making up a set. At present sets vary from 1 to over 30 splints. We consider that there is an urgent need to evaluate the many types and scales of splints in use. Until, however, the Council is able to make a recommendation, the only recommendation that we can make is that one set of splints should be carried, its composition being left to the discretion of ambulance authorities. Nevertheless evidence suggests that only four types are needed, i.e. for the whole leg, the lower leg (both to include foot angles), the whole arm and the lower arm; experience within the ambulance service has shown that types for other purposes are rarely used.

26. We were aware of differing views on the value of inflatable splints, but enquiries of hospitals served by ambulances using inflatable splints shewed that, whilst a number of limitations were mentioned, only 6 hospitals of the 41 which replied to our enquiries considered the inflatable splint undesirable. Most hospital authorities considered inflatable splints to be an advance on other types and many praised them highly, mainly because they allow more observation of the affected limb, are easier to apply and make the patient more comfortable. The two main criticisms of this splint were that circulatory difficulties could arise if the splint were over-inflated or kept on too long (30 minutes was suggested as a limit by one hospital) and that it was no use with a fractured femur or humerus.

27. We consider that inflatable splints are valuable for fractures, including open fractures, below the knee or of the forearm, and that ambulances equipped for emergency purposes should carry these splints and that staff should be trained to use them. Training should call attention to the dangers of over-inflation, to guard against which inflation should be by mouth, and to the need for ambulance staff to report to the receiving hospital the time when the splint was put on. These splints are unsuitable for transport of patients by air. Further research is, however, necessary into these as well as other kinds of splint.

Waterproof sheet

28. We recommend that two waterproof sheets should be carried on emergency ambulances. They can be used either for putting under or over the patient as necessary.

Burns sheets

29. We recommend that two burns sheets should be carried on emergency ambulances so that the patient can if necessary be completely enclosed. They should measure 3′ × 4′, and should be sterile. Up to the present cotton material has proved satisfactory; as other materials become available they should be investigated by the Council.

Hand lamps

30. A lamp should be provided for each member of the ambulance crew. It should be capable both of being clipped on to the uniform and of standing on the ground.

Maternity packs

31. We recommend that the following sterile maternity pack should be carried on emergency ambulances. Each item should be in its individual sterile pack:

2 maternity pads
1—15″ absorbent square
antiseptic cream
1 pair surgical scissors
2 cord clamps
1 mucus extractor.

In addition, 1 large terry cotton blanket and 1 small terry cotton cot blanket should be carried, preferably in a plastic bag, to be used for any maternity case, once only, between launderings.

Manifold stretcher harness

32. One set should be carried for use in conjunction with a Furley type stretcher or a trolley on emergency ambulances.

Gloves

33. We recommend that six pairs of disposable gloves should be carried on emergency ambulances. In addition, one pair of insulated gloves, conforming to and tested in accordance with B.S. No. 697, should be carried on such ambulances. In areas where there are live rails one pair should be carried in each first aid satchel.

Items for hygiene purposes

34. We consider the following items desirable on emergency ambulances:—

A dispenser containing disposable paper tissues large enough to be used as towels and covers for pillows.

Disposable bags for waste such as used dressings and tissues.

Deodorant spray.

35. We feel there is wide scope for the development of ambulance equipment, both disposable and non-disposable, using modern materials and fabrics. Where equipment is liable to be taken into operating theatres it should have anti-static properties; this is an example of the need to take the requirements of the hospital service into account when deciding on ambulance equipment. In addition, certain items should be standardised to facilitate the interchange of equipment between hospitals and ambulances, as recommended by the Platt Report. At present there are no facilities by which the whole range of equipment is co-ordinated or catalogued and we would urge the Council to give thought to this possibility.

C. CONTENTS OF FIRST AID SATCHELS AND DRESSINGS CASE

36. We recommend that a first aid satchel should be available for each member of the ambulance crew and that the items contained in it should be selected so that its bulk does not hamper his movements. Nevertheless, he should have essential items readily available so that on recognising the nature of a patient's condition he can act immediately without going back to the vehicle. In addition, emergency ambulances should carry a dressings case to supplement the first aid equipment carried in the satchels. The contents of these are given in Appendix C.

D. ITEMS NOT CONSIDERED NECESSARY

37. In the evidence submitted suggestions were made for the provision of a number of additional items, which we do not consider necessary. These items and our reasons for not recommending them are discussed in paragraphs 38 to 43 below.

Poison antidotes

38. In view of the very wide range of poisons we would not expect ambulance crews to be able to identify their effects in many cases nor ambulances to carry the full range of appropriate antidotes. Hospitals are best able to apply the necessary specific treatment because of their resources for identifying poisons, including access to the National Poisons Information Service, and the variety of treatments they have available. We consider, therefore, that ambulances should not carry antidotes. The first objective should be to deal with the effects as they arise whilst getting the patient to hospital without delay.

Surgical instruments and plasma

39. We do not consider that the number of occasions on which surgical instruments and plasma have been used at the scene of an accident justifies making them part of the standard equipment of even an accident ambulance. As indicated in paragraph 7, we consider that if they are needed the local accident and emergency services should be so organised as to be able to provide what is necessary.

Pain-relieving drugs

40. Up to the present ambulance crews have not been authorised to administer pain-relieving drugs because:—

(*a*) the ambulance service (unlike first aiders in mines, lifeboats and mountain rescue parties, who are authorised to administer pain-relieving drugs) can usually rely on getting the patient to hospital in a comparatively short time or upon calling medical help quickly;

(*b*) the difficulty in recognising the conditions when pain-relieving drugs should not be administered and the harm caused by administering them either in circumstances when symptoms might then be masked or when these drugs would be positively detrimental is thought to outweigh the advantages of giving relief from pain.

41. We are aware that an important factor in prognosis is the extent to which pain and anxiety can be promptly alleviated and we have enquired into the possibility of any analgesics in ambulance work. A mixture of 50% nitrous oxide and 50% oxygen is being introduced for domiciliary midwifery which could be administered by ambulance attendants but the usefulness of this mixture in ambulance work will need further examination, as will other developments in analgesics.

42. In the meantime a few authorities dealing with accidents in situations where doctors are unlikely to be readily available (e.g. in areas far removed from roads) could well consider that there is already a case for their ambulances to carry pain-relieving drugs and even for selected ambulance staff to be trained in their use. Nevertheless, in general, we consider that ambulances should not carry these drugs either to be used by their crews or so that they may be available to a doctor on the scene who has not the drugs with him. The experience of those authorities who have carried drugs is that doctors rarely arrive without drugs and thus rarely need to make use of the drugs carried.

Other items

43. Ground sheet	This is not needed in addition to the two waterproof sheets.
Neil-Robertson stretcher	This stretcher need only be available at stations for special cases, in particular in those areas where rescue from a confined space is expected.
Fracture boards	These are cumbersome to carry and are not necessary if crews are adequately trained in dealing with spinal injuries.
Sand bags	We see no need to carry these as immobilisation of limbs can be effected with items of equipment which must in any case be carried for other purposes, e.g. blankets and dressings.
Thomas splint	This is not considered suitable because it is too elaborate and time consuming for normal emergency work. However, because ambulance crews may meet it when transferring patients they should be taught how to manage it.
Contour splinting plaster of Paris	We had a demonstration of this by members of the R.A.M.C. which impressed us greatly. While we consider the application of contour splinting unsuitable for normal urban accidents we are convinced that in certain areas authorities would find this extremely useful, particularly where the patient has to travel long distances or has to be moved in difficult circumstances.

Stretcher cover	One of the two waterproof sheets recommended could be used for this purpose.
Fixed washing bowls	These are desirable but not essential.
Constrictive bandages and tourniquets	We consider that these items should not be used by ambulance crews. They have no place in first aid and immediate treatment and the arrest of bleeding can be achieved by the correct application of pressure.

E. RESCUE EQUIPMENT

44. It is the usual practice for the fire service to be called when there is a rescue problem, particularly if heavy rescue equipment is needed. Nevertheless, it is not uncommon for ambulance services to be required to undertake light rescue operations to release patients from crashed cars and other situations before they can be given treatment and taken to hospital. We recommend, therefore, that simple rescue equipment should be carried on emergency ambulances to enable a casualty to be released or at least to receive treatment expeditiously. We also recommend that all the items of rescue equipment, apart from the fire extinguisher, should be carried in a locker which opens from outside the vehicle. The items recommended are listed in Appendix D. We appreciate that additional and specialised rescue equipment will be needed by some authorities to meet particular local problems, e.g. rescue from mountainous areas, pot-holes, etc.

F. MAJOR ACCIDENT EQUIPMENT

45. The Ministry of Health gave advice to local health authorities in Circular 13/54 and to hospital authorities in Hospital Memorandum (54) 51 on the arrangements needed for dealing with major accidents. We have reviewed that advice and recommend that provision should be made for conveying to the scene of a major accident adequate quantities of normal ambulance equipment and a certain amount of rescue equipment. We recognise that a large number of items of rescue equipment are available but we consider that only items of immediate use in the rescue of lightly trapped patients, and items which may be necessary to clear obstacles from the path of ambulances and for the erection of signs, should become part of standard ambulance service equipment. These items should be made up into standard sets in accordance with Part I of Appendix E and a set should be held in readiness at each selected supply point. The equipment should preferably be kept loaded on its own vehicle, which should have four-wheel drive.

46. The area to be served by each supply point should be chosen according to the degree of urbanisation and the degree of risk. The aim should be that at least one set of this equipment should arrive at the scene of a major accident soon after the first ambulances and we therefore recommend, as a guide to the location of these points, that in highly urbanised and high risk areas it should be possible to bring the equipment to the scene within 15 minutes and in other areas within 30 minutes.

47. We also consider that an ambulance control vehicle is essential for major accidents. This vehicle will need to be equipped with radio-telephone, and it should be specially designed as a mobile control unit and have four-wheel drive. The vehicle will need to carry some illuminated identification symbol and we consider that the Council should devise a standard symbol recognisable by all services attending an incident. When it is normally located at a place which is also a major emergency equipment supply point it might, with advantage, combine the functions of mobile control and equipment carrier.

G. EQUIPMENT FOR JOURNEYS BY RAIL OR AIR

48. Journeys for which equipment is needed fall into two categories:—

(*a*) journeys by escorted patients who must travel on a stretcher;

(*b*) journeys by escorted patients who do not require a stretcher.

For cases travelling by rail a reserved compartment is, in effect, converted into an ambulance compartment. Patients' escorts should have all necessary equipment to hand; the scales we recommend are set out at Appendix F. We recommend that these items should be made up into packs.

H. UNIFORM AND INSIGNIA

Uniform

49. To encourage pride in the service and a sense of responsibility, we consider that it is essential that all grades of the ambulance service should be provided with full uniform including shoes, socks and driving gloves. We recommend a standard uniform for all ambulance services, as is substantially the case with police and fire services. The Council should look into the question of uniforms specially designed for the various ranks of ambulance staff and, in this connection, we should like to draw attention to the benefits of a combat jacket type of uniform. Whilst in uniform all ambulance men should carry a simple first aid dressing, e.g. first field dressing; we have, therefore, made provision for this in the list of items of personal equipment which we recommend for issue to ambulance men. These are set out in Appendix G.

Insignia

50. In making our recommendations for insignia we considered the ranks for which provision should be made. All these may be used by the very large services but the majority of services will only need to use some of them. We recommend that these should be as follows:—

Chief Ambulance Officer
Deputy Chief Ambulance Officer
Assistant Ambulance Officer
Superintendent
Deputy Superintendent
Station Officer
Deputy Station Officer or Shift Leader
Leading Ambulance Man.

There could be more than one grading of Superintendent and Station Officer based on the degree of responsibility involved, e.g. on the number of vehicles at the station or commensurate responsibility if in charge of other types of work. Recommended insignia are indicated in Appendix H.

I. RADIATION RISK EQUIPMENT

51. Ambulances may be called to accidents involving radioactive materials in factories and laboratories, to such accidents on the roads and railways and in connection with air transport, as well as to accidents with service aircraft carrying nuclear weapons. Up to now ambulances have not been called to accidents of this type; indeed there have been no such accidents in this country to aircraft or to rail traffic and very few (and these of minor consequence) to vehicles and in factories and laboratories.

52. Factories and laboratories handling radioactive materials usually have skilled staff and the strictest precautions are taken to avoid excessive radioactive contamination. In the event of an accident the level of contamination would still be comparatively low. In the unlikely circumstances of there being a harmful level of contamination it would not be necessary for an ambulance crew to expose themselves to it in order to remove casualties from contaminated areas as the staff of the factory or laboratory would almost certainly be able to do so. If in addition there was a fire or a casualty was trapped the fire service would be called and arrive equipped with the necessary protective clothing including breathing apparatus or service respirators to protect against inhalation of alpha and beta active material and would be able to remove casualties from the contaminated area so that ambulance crews could deal with them.

53. Consignments of radioactive material sent by railway, road or air are packed, if in excess of approved levels of activity, so as to withstand the equivalent of a head-on collision at 30 m.p.h. in conjunction with a fire of 800°C. burning for half an hour. In addition, in the case of consignments of particularly high activity sent by road, special precautions (traffic control, low speed limits) are taken. Consignments that are not packed in this way would, if breached, be unlikely to release other than a low level of activity, several hours of exposure to which would not lead to harm. Ambulance crews would thus be able to attend to casualties without risk. If the ambulance crew became aware that (by a remote chance) the packaging of a consignment having a high level of activity had not withstood the impact of the accident they would try to remove any casualties quickly; if however a casualty was trapped or if there was a fire the ambulance crew would have to rely on the fire service to remove casualties from the contaminated area. Further, there are national arrangements for dealing with incidents involving radioactive substances under which the police call expert assistance in the case of accidents to vehicles carrying such substances or where there is damage to containers at premises where expert assistance is not immediately available. These arrangements and arrangements for monitoring and decontaminating ambulance crews, equipment and vehicles are described in Ministry of Health Circular 3/64.

54. It is standard practice for both the ambulance and fire services to assume that an accident to a large military aircraft might involve a radiation risk. If, in fact, aircraft carrying a nuclear weapon were to crash this would be more likely to happen in landing or take-off, in which case the R.A.F. would have their own staff and equipment standing by to deal with the situation. If the crash occurred away from an airfield, though the police might well be able to call an R.A.F. team quickly to the spot, it is possible that the local ambulance service summoned by an eye witness might be the first on the scene. It would, however, be the practice for ambulance control directing an ambulance to the scene of a crashed aircraft to alert the fire service because of a fire risk. Here again the fire service, with protective equipment as above, would be able to remove casualties from the contaminated area, though we would expect ambulance crews to remove casualties if this could be done quickly.

55. Even with accidents not involving radioactive material ambulance crews are not always equipped to gain immediate access to casualties. For example, where there is a fire, dense smoke or chemical fumes, it is necessary for the fire service first to remove the casualties from the area exposed to fire or smoke. It is reasonable that accidents involving harmful radioactive contamination, which are likely to be extremely rare, should be handled in the same way. We, therefore, do not consider that ambulance services need have protective clothing, respirators or equipment for dealing with accidents involving radioactive materials. The training for which we have made provision in Part 1 of our Report will enable ambulance crews to minimise the risks that might arise if accidents involving radioactive materials were to occur.

J. EQUIPMENT FOR INFECTIOUS DISEASES

56. Smallpox

Detailed guidance on the use of ambulances for smallpox patients, the protection of the crews and the subsequent disinfection of the vehicles and contents is given in the Memorandum on the Control of Outbreaks of Smallpox, issued jointly by the Ministry of Health and Scottish Home and Health Department in 1964 (S.O. Code No. 32–525). In accordance with that Memorandum we recommend that the following items of equipment should be held in packs in readiness for ambulance crews called upon to deal with smallpox cases. This equipment should not be used for any other purpose.

Gum boots

Skull caps

Overalls (Boiler suit)

Containers for infected bedding (to be marked "Smallpox")

Containers for infected clothing (ambulance crews) (to be marked "Smallpox")

Disinfection equipment or arrangements for carrying out disinfection must be readily available.

57. Other Infectious Diseases

We recommend that the following equipment should be available as necessary:—

White gowns or coats
Containers for infected ambulance bedding and gowns or coats
Spray for disinfection.

K. CONTROL EQUIPMENT (other than radio)

58. Control equipment may include any, or all, of the following:—

- Telephone switchboards (manual or automatic)
- Telephone key and lamp units
- Control console
- Teleprinter and telex equipment
- Tape recording equipment; equipment to receive general calls and equipment to monitor '999' messages
- Wall and quick reference maps
- Vehicle tally board or its equivalent
- Quick reference street index equipment
- Sorting tables
- Synchronised 24 hour clocks
- Bell alarm system
- Quick reference advance booking system
- Quick reference repeat booking system
- Equipment to date and time-stamp all incoming messages to minimise risks of errors and disputes.

59. We consider that research and field trials are necessary to evaluate control equipment and systems already in use, and to evaluate new equipment as it becomes available. This must be a long and continuing process and we hope that the Council would be able to carry this out.

L. RADIO EQUIPMENT

60. The G.P.O. has reserved at least one channel for each of the 142 ambulance services and 136 services are making use of this facility. Control by radio has greatly increased the efficiency and economy of ambulance services but because radio schemes have been developed independently on a local basis, ambulances spend much of their time beyond the range of their home base equipment and are unable to contact any other base or any hospital outside their home base area. By extending the range of equipment and by increasing the flexibility of radio schemes mutual support between ambulance services could be improved and duplicate journeys and empty mileage reduced. Such a co-ordinated scheme should also be designed to facilitate direct communication between ambulances and designated hospitals as recommended by the Platt Report. At present hospitals often receive casualties brought in by several ambulance services and they cannot be expected to have independent radio links with each of them.

61. We recognise that, because of the technicalities involved and because it would be uneconomical to replace existing equipment before it is near the end of its useful life, these much needed improvements would have to be part of a long term plan. We, therefore, recommend that:—

- (*a*) the Council should advise on the co-ordination of ambulance service radio schemes and on linking them with hospitals;
- (*b*) the Ministry of Health should discuss with the G.P.O. long-term plans accordingly;

(*c*) thought should be given, as the design of radio equipment improves, to miniature sets capable of being carried on the men themselves so that they can maintain contact with ambulance control when away from their vehicle.

M. PORTABLE INCUBATORS

62. We recommend that these should be held, properly maintained and periodically inspected, at selected ambulance stations, unless it has been agreed locally that hospitals will provide them at short notice. We consider it essential that the Council should promote the clarification of procedures and the standardisation of equipment, especially electrical connections, to minimise possible delays or misunderstandings with hospitals and to ensure that incubators can be connected to the electric supply in hospitals, ambulances and private dwellings, the electrical connections being designed so that the incubator can be connected only to the appropriate source of supply i.e. mains or vehicle.

N. VEHICLES

63. Persons to be conveyed by ambulance vehicle fall broadly into three groups:—

(*a*) Stretcher patients. Although most of these do not require treatment or attention during the journey this is not often known in advance and most ambulance vehicles normally used for stretcher patients therefore need to have enough space to enable attendants and others to give such treatment and attention. A small number of patients need comfortable transport and little treatment or attention; "limousine type" vehicles, adapted from larger private cars, can be used for these patients and may be particularly appropriate for longer journeys.

(*b*) Patients whose need is only for a seat in a vehicle but who require considerable assistance and may have to be carried to their seats.

(*c*) Ambulant patients whose need is only for a seat in a vehicle with little or no assistance.

Out of some 20 million journeys per annum 4 million are for stretcher patients (group (*a*)) and 16 million are for patients who need only sitting accommodation (groups (*b*) and (*c*)).

64. Partly because of the differing needs of patients but partly also because of differing resources and differing policies, local authorities make use of many kinds of ambulance vehicle. The evidence submitted in response to the questionnaire on vehicles which we sent to ambulance authorities showed that, whilst at least eight types of vehicles would be required to satisfy all authorities, in addition to some special types for local purposes, the main requirements are for :—

(i) an ambulance designed to carry two stretcher patients but capable of carrying eight or more sitting patients;

(ii) a vehicle mainly for sitting patients but with alternative capacity for a stretcher patient;

(iii) (to a lesser extent) a vehicle for sitting patients with no facilities for a stretcher patient.

65. We formed the strong impression that comparatively few ambulance authorities at present could afford to provide separate fleets of vehicles for stretcher and sitting patients. While for the reasons given in paragraph 73 below, we consider that the needs of stretcher and sitting patients cannot be fully met in one type of vehicle, we recognise that authorities at present are bound to make considerable use of dual purpose vehicles. Because of the need to compromise in this way we accept that the following four types of vehicle will need to be used:—

Type I An ambulance specially designed for a maximum of two stretcher patients, with seats for a maximum of two escorts, and with sufficient width and height to enable nursing and treatment to be given during the journey; there would thus be a maximum of six persons including crew.

Type II A dual purpose ambulance adaptable for:—
either 2 stretcher patients
or 1 stretcher patient and 4 sitting patients
or 8 sitting patients.
There would thus be a maximum of ten persons including crew.

Type III A dual purpose sitting case vehicle primarily designed for about 10 sitting patients in forward or rear facing seats and adaptable to take one stretcher when required.

Type IV Other sitting case vehicles which could be of various sizes according to the extent of sitting accommodation required but with no facilities for stretcher accommodation.

66. We have used the terms "dual purpose ambulance" and "dual purpose sitting case vehicle" because we have found the term "dual purpose vehicle" at present in use ambiguous: most authorities use it to denote a conventional ambulance with a bench seat (or seats) convertible into a stretcher bed, whilst some use it also to denote a light sitting case vehicle which is designed to take a stretcher on the floor in exceptional circumstances.

67. We recognise that there may be local needs for which other kinds of vehicle may be appropriate and in particular we appreciate that in present circumstances, when no fully satisfactory Type I ambulance is available, authorities may wish to use "limousine type" ambulances (which are adapted from larger private cars) for the recumbent patient requiring fast and comfortable transport on a longer journey but little attention on the journey.

68. We also investigated the possibility of using hovercraft for ambulance transport. Hovercraft are intended to operate over water and on land, usually adjacent to water, which is relatively flat or gently undulating. Their hovering height and thus their ability to ride over obstacles is related to the height of the flexible skirt which encloses the air cushion underneath the craft and the height of the skirt depends on the size of the craft. Thus, even if a hovercraft the size of a road vehicle could be produced—they are generally much larger—it could hover only a few inches above the ground and would not be able to negotiate the obstacles encountered in cross country journeys. It would also be useless on ordinary roads because of lack of control, noise and the violent ejection of air around the base of the craft. Unless, therefore, there are important developments we see no place for hovercraft as overland ambulances. But where there is a regular demand for the transport of patients across or along waterways, there are good prospects that small hovercraft could be adapted as water-borne ambulances. We understand that trials to this end have already commenced and also that research has started on the development of a "Hover bed" which might be adaptable for use in ambulances: the Council will no doubt take an active interest in these developments. Also, where passenger service hovercraft already operate, there is no reason why these craft should not be used for the transport of patients in the same way as other ferry services are used.

69. We noted from the replies of ambulance authorities to the questionnaire on vehicles that the majority are satisfied with their sitting case vehicles but less than a third are satisfied with ambulances used for stretcher patients. For this reason, and because ambulances used for stretcher patients carry the kind of patients for whom the nature of the journey may make a significant difference to the extent of suffering, the degree of deterioration and even the chance of survival, we decided to give priority to the design and specification of ambulances of Types I and II above. This is not to say that there is not scope for the development of sitting case vehicles, in particular to ensure that when sitting patients are carried facing sideways they are both comfortable and adequately supported, and we would hope that the Council would give attention to this matter and to appropriate safety standards.

In the meantime we would urge that:—

- (*a*) sitting patients should be carried whenever possible in forward or rear facing seats;
- (*b*) as sitting case vehicles are often adapted to carry a stretcher patient merely to avoid the payment of purchase tax, the question of exempting such vehicles from purchase tax without modification should be taken up with the Board of Trade.

70. Ambulances at present in use for stretcher patients have been widely criticised because:—

- (*a*) the centre of gravity is too high and this exaggerates the effects of pitch and roll with consequent sickness, distress and unnecessary suffering for recumbent patients;
- (*b*) the wheel base is too short, resulting in excessive jolting to recumbent patients, who cannot avoid being partly over the rear axle;
- (*c*) the types of suspension and springing used, even when modified, are designed for sitting passengers or inert loads and are not appropriate to the needs of recumbent patients;
- (*d*) heating and ventilation are unsatisfactory.

71. Some of these criticisms can be met by independent suspension for stretchers. Many other devices for modifying the existing goods vehicle chassis were submitted in evidence and in the answers to our questionnaire. None of these seemed to us to warrant special mention and indeed devices advocated by some authorities were condemned by others. We concluded therefore that miscellaneous modifications to goods vehicle chassis were unlikely to make any substantial improvement on the standard ambulance modifications developed by manufacturers.

72. Nevertheless, we would not wish to discourage ambulance authorities from trying to improve their vehicles by further non-standard modifications but we would urge them to agree any such modifications in advance with chassis manufacturers and body builders because the balance and road holding qualities of a vehicle can be disturbed by quite minor modifications. For the same reason it is important that the type, dimensions and weight of the body should be approved by the chassis manufacturer for the type of chassis and suspension they supply.

73. We were, however, conscious of a basic contradiction in the relation between the design of ambulance vehicles and their use. Size of wheel and tyre pressure are necessarily designed for maximum safety when maximum loads are carried (e.g. ten sitting patients) and are consequently inappropriate for lighter loads (e.g. one or two stetcher patients). It is not possible to vary the wheel size or even the tyre pressure to suit any particular load and devices for varying the suspension can at best only mitigate this fundamental difficulty.

74. We noted from the replies to our questionnaire that over two thirds of ambulance authorities are not prepared to leave it to manufacturers to make improvements but are concerned that efforts should be made to develop a special chassis for Type I and Type II ambulances.

75. Many authorities submitted specification details and we also considered designs for ambulances submitted by individuals. These included:—

(*a*) drawings and technical data for a complete ambulance, the body of which could be lowered to ground level;

(*b*) ambulance bodies as separate units attached to a six-wheeled chassis only by a self-compensating suspension similar to that of a ship's compass;

(*c*) stretchers to be loaded into the sides of ambulances by means of hydraulically operated lifting arms.

Whilst we were impressed with the ingenuity of these ideas and wish to thank the authors for their efforts to assist us, we consider that none of them offers a sound basis for development, because of prohibitive costs and manufacturing difficulties. Even if prototypes which satisfied some of the criticisms given in paragraph 70 above could be produced, they would be too complicated and would require too much specialised maintenance to be of practical use in the ambulance service.

76. We recognise that ambulances are not required in sufficient numbers (probably not more than 600 of Types I and II per year) for the motor industry to do more than adapt general improvements in vehicle design to ambulance vehicles. If, therefore, progress in vehicle design specifically for ambulance purposes is to take place a research project is necessary. We cannot give an exact idea of the cost of such a project, but from enquiries we have made we estimate that it might cost something of the order of £60,000 spread over three years.

77. In our view the needs of the seriously ill or injured persons who are often carried by Type I and Type II ambulances are not being adequately met by the

vehicles at present in use and the criticisms listed in paragraph 70 above are valid ones. We, therefore, recommend that the Council should be given the means to sponsor the kind of research project necessary to evolve a suitable vehicle for stretcher patients. An outline specification is given at Appendix I.

MINORITY REPORT ON PAIN RELIEVING DRUGS by Sir Alexander Drummond and Dr. Stoker.

Reference Recommendation No. 44—In general pain-relieving drugs should not be carried. (See paragraphs 40 and 42).

In our opinion no Ambulance Service, in the interests of the patient, should instead of carrying these drugs have to rely upon getting their patient to hospital in a comparatively short time, or upon calling help quickly. A doctor (as repeatedly shown at the meetings of the Working Party) even if immediately available may not have with him the necessary pain-relieving drugs.

We are well aware of the dangers attendant on the use of morphia and specifically exclude this drug from our recommendations.

We recommend as did, we are informed, the 1951 Working Party, supported by the British Medical Association, that all attendants in the Ambulance Service be trained in the correct use of pain-relieving drugs and that authority be obtained for them to administer these drugs.

In the case of the voluntary First Aiders in the Mines, Life Boat Crews and Mountain Rescue Teams, this has been agreed and practiced for some years.

The Cadet cadre of the Liverpool Ambulance Service receive this special training.

We recommend that, together with a similar Cadet Training Scheme, this special training be adopted by other Ambulance Services, and that such trained Ambulance Attendants be authorised to carry and administer, in prescribed circumstances, safe pain-relieving drugs.

Alexander Drummond
A. D. Stoker

APPENDIX A

AMBULANCE STRETCHER GEAR

1. Various methods for loading and unloading ambulances are used. The method adopted is to a large extent dependent on the type of gear used. A general description of the three types of gear mainly in use is given in paragraphs 2 to 9 below.

Gear for outside loading

2. This enables a loaded stretcher to enter and leave an ambulance without being carried up and down steps. It is usually fitted on the near side of the vehicle and consists essentially of a cradle with runners that can be swung or slid out of the back of the vehicle for loading and unloading. The stretcher is placed on the runners, slid into place and made fast; the cradle is then pushed or swung back into the ambulance. These devices cannot be used unless the patient is first placed on a stretcher whilst still outside of the ambulance.

3. Some makes of this gear can take any rigid stretcher of standard dimensions, but the most popular type of outside loading gear in use can be used satisfactorily only with its own patent stretcher and this stretcher cannot be used with other makes of gear whether for outside loading or otherwise.

4. Ambulances fitted with outside loading gear on one side usually have fixed or in-built stretcher mounting on the other side so that there are two types of gear in the one ambulance.

Gear for inside (carry-in) loading

5. There are several varieties of this type but basically they all consist of a bench on to which a stretcher can be fitted. Some benches are padded and can act as mattresses or seats so that patients can be comfortable even on pole and canvas stretchers without additional padding.

6. Patients may be carried into ambulances on stretchers which are then placed on the bench supports or they may be carried in on carrying chairs, etc. and then transferred to the bench. Benches which serve as ambulance beds or stretcher supports can usually be adapted to form seats for sitting patients.

7. Ambulances can have this type of gear fitted on both near and off-sides (making both sides available for either recumbent or sitting patients) or on one side only if outside loading gear is fitted on the other.

Ambulance trolleys*

8. These can be of various designs but ideally they should have padded tops which serve as stretcher supports, beds or seats.

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*We have used the expression "Ambulance trolleys" in the Report in order to avoid confusion with the trolleys used in hospitals and other institutions, which could not be used for the general ambulance purposes mentioned in paragraph 14 below. We would hope that this term will be generally accepted.

9. Patients can be carried into the ambulance (as in the case of gear for inside (carry-in) loading gear) on a stretcher or in a carrying chair, etc., and then transferred to the trolley-bed. Alternatively, the trolley can be taken out of the ambulance, the patient can be placed on the appropriate support and wheeled to the ambulance into which it is partly wheeled and partly lifted. Once inside, the trolley should be secured with a locking device.

Demonstration

10. The above types of stretcher gear were demonstrated to some of us by ambulance officers and ambulance crews whose services specialise in one of the types and we are grateful to the authorities and staff concerned for the time, effort and ingenuity which were devoted to this and which did much to clarify our ideas on the subject. Special attention was paid to the following:—

- (*a*) Transport of recumbent patients from small houses, etc., often down narrow staircases, when it is impossible to use a stretcher.
- (*b*) Transport of casualties from open-air incidents—including incidents where the ambulance must be left some distance from the scene of the accident.
- (*c*) Unloading and subsequent carrying and trolley arrangements for patients in (*a*) and (*b*) above on arrival at hospitals.
- (*d*) Loading and carrying arrangements for discharged recumbent patients both at the hospital and on arrival at their destination.
- (*e*) The problem of lifts (in hospitals, offices and blocks of flats) which are not big enough to take standard stretchers.
- (*f*) The lifting strains and amount of inconvenience and waste of time when suitable trolleys are not readily available.

Advantages and disadvantages of the three kinds of gear

11. The demonstration and subsequent discussions with the ambulance officers and crews concerned showed that each type of stretcher gear and each method of loading and unloading had advantages and disadvantages; these are listed in paragraphs 12, 13 and 14 below.

Gear for outside loading

12. Advantages

1. (1) If patients are on stretchers before loading begins, they do not have to be carried up and down ambulance steps.
2. (2) Because this type of loading gear cannot be used for sitting patients mattresses can be specially designed to increase the comfort of recumbent patients; also some of the proprietory stretchers used with this type of gear incorporate their own adjustable back-rests.

Disadvantages

- (1) A proprietory stretcher which cannot be used for other ambulances or even on the opposite side of the same ambulances is used in many services.
- (2) When not required for stretcher patients, this expensive loading gear cannot be safely and comfortably used for sitting patients.

(3) There is an uneven distribution of weight when sitting cases are being carried because they can only sit on the side in which the loading gear is not fitted.

(4) The manoeuvre required to place one end of a stretcher on the proprietory gear whilst the stretcher is still outside the ambulance can be difficult and dangerous.

(5) The mechanisms of outside loading gear can become defective and the "push-in" or "swing-in" motion of loading from the outside can be distressing to patients.

(6) Before loading and after unloading patients must be carried to and from ambulances—unless suitable trolleys can be quickly obtained from sources outside the ambulance service—e.g. at hospitals and railway stations.

(7) Outside loading can only be used if the patient is on a rigid stretcher. Thus if a patient has to be carried from a house in a chair, etc., he or she must then be transferred to a stretcher before being loaded into the ambulance if advantage is to be taken of the loading gear. This may have to be done outside in public view and perhaps in bad weather. Because of this ambulance crews often carry their patients straight into the ambulance on carrying chairs—thus wasting the expensive proprietory loading devices.

(8) Full width rear doors have to be used resulting in weaker body construction, danger from the wide swing of the large doors, and excessive loss of heat and loss of privacy when the doors are fully open.

(9) Full width steps are required at the rear of the ambulance, which complicate body construction and make entry difficult for walking patients.

(10) There are no occasions when outside loading gear is essential and as it is an integral part of the ambulance it is usually discarded when the vehicle is replaced.

Gear for inside (carry-in) loading

13. Advantages

(1) A patient brought from a house on a carrying chair can be taken straight into the ambulance.

(2) When unloading the most suitable method of carrying (stretcher or carrying chair, etc.,) can be used to give one continuous carry from the inside of the ambulance to the bedside.

(3) A stretcher from a road accident can also be carried straight into the ambulance without the complications of loading mechanisms.

(4) Any type of standard dimension stretcher can be used (including pole and canvas if the platform is padded or has a mattress on it).

(5) If the gear is fitted on both sides, then both sides can be used for sitting patients, thus increasing flexibility of use.

(6) There is a standard loading drill if the gear is used on both sides.

(7) Loading and unloading are not dependant on mechanical devices.

(8) Only a central rear door is required, thus allowing stronger body construction, less complicated steps, more heat preservation and privacy and easier access for walking patients.

(9) In addition to an actual reduction in cost, there is better value for money in that the gear can be used as a bed for stretcher patients or as a seat for sitting patients.

(10) Independent shock absorbing units, suitable for varying loads, can be incorporated in the gear.

Disadvantages

(1) Crews have to lift patients into and out of ambulances.

(2) Before loading and after unloading patients must be carried to and from ambulances, unless suitable trolleys can be quickly obtained from resources outside of the ambulance services—e.g. at hospitals and railway stations.

(3) Although the stretcher beds fixed inside the ambulance may be adaptable to provide back-rests, patients do not have this comfort or a mattress when they are being carried to and from the ambulance on a stretcher or in a carrying chair, etc.

Ambulance trolleys

14. Advantages

(1) Easy loading and unloading when trolleys are removed from ambulances for use as wheeled stretchers or mobile beds.

(2) Carry-in loading with all its advantages, even when trolleys are not removed from ambulances.

(3) Any type of stretcher, including pole and canvas, can be used or trolleys can be used without stretchers.

(4) Trolley tops padded for use as mattresses can also be made adjustable to give the most comfortable contour positions for patients. They can provide comfortable seating in the ambulance for sitting patients.

(5) Only a central rear door is necessary.

(6) Independent shock absorbing units, suitable for varying loads, could be incorporated in trolley design.

(7) A wheeled trolley is always immediately available when required. (Delays at hospitals and railway stations would be reduced, as ambulance crews would not be dependent on the availability of hospital or railway trolleys, some of which are unsuitable in any case).

(8) Trolleys do not have to be scrapped when vehicles are replaced.

(9) Design of ambulance bodies is simplified; the interior is both more hygienic and more flexible in use (when trolleys are removed, ambulance bodies are clear for cleaning or for taking wheel chairs, etc.).

(10) In suitable locations the use of trolleys would relieve patients and ambulance crews from the discomforts and strains which arise when patients have to be carried.

(11) There could be three trolley fixing positions in each ambulance. Normally two trolleys would be carried—one on either side of the ambulance. But when seriously ill or injured patients were known to require special care during a journey, one trolley could be fixed centrally in the ambulance, giving room to work all round the patient.

(12) If the bed which forms the top of the trolley is adjusted so that the patient is in the half reclining or sitting position, the over-all length of the trolley is reduced; without transfer from one piece of equipment to another, patients can then be taken in lifts which are not big enough to take standard stretchers.

(13) Trolleys permit a patient to remain undisturbed on a journey involving several changes, for example on ambulance—train—ambulance journeys.

Disadvantages

(1) Unless special safety devices are incorporated in the design, there could be a danger of unattended trolleys running out of control down slopes.

(2) Mechanical devices, easy and quick to operate and of absolute reliability, are necessary for securing the trolley in the ambulance.

(3) Trolleys are much heavier than pole and canvas stretchers; with a bed they can weigh as much as 45 lbs. A pole and canvas stretcher weighs about 7 lbs. with light poles and 11-12 lbs. with heavy poles. The Civil Defence type stretcher, like the Furley type, weighs about 25 lbs. A new model of the military stretcher is being introduced weighing 16 lbs. That trolleys are heavier is not however of prime importance as they are normally wheeled and only lifted in or out of ambulances or over uneven ground for short periods by a crew not already fatigued by carrying a stretcher. In circumstances where a trolley cannot be easily wheeled a pole and canvas stretcher would be used.

(4) The incorporation of devices used to isolate the stretcher bed from the vibrations of the vehicle in the design of trolleys would add to the weight of the trolley.

Recommendations

15. With proper design, disadvantages (1) and (2) above attendant on ambulance trolleys could be eliminated; if used with pole and canvas stretchers which we recommend trolleys could then provide most of the advantages, with few of the disadvantages, of other types of stretcher gear—and additional advantages which are completely beyond the scope of these other types. They should therefore be developed as standard equipment for all ambulances.

APPENDIX B

SCALES OF EQUIPMENT

The four scales of equipment set out in the table below are for use as follows:—

Scale A	for *Ambulances** (Type I) and *Dual Purpose Ambulances** (Type II) which are used for emergency patients.
Scale B	for *Ambulances** (Type I) and *Dual Purpose Ambulances** (Type II) which are NOT normally used for emergency patients.
Scale C	for *Dual Purpose Sitting Case Vehicles** (Type III) which although designed primarily for sitting patients also have improvised facilities to take a stretcher patient.
Scale D	for *Sitting Case Vehicles** (Type IV) which are never used for stretcher patients.

*See paragraph 65.

	Scale A	Scale B	Scale C	Scale D
Stretcher trolleys	2	2		
Stretcher poles	4	4	2	
Spreaders	4	4	2	
Canvases	4	4	2	
Stretcher (Furley type)	1			
Pillows	2	2		
Mattresses	2	2		
Blankets	6	6	2	2
Carrying chair	1	1	1	
Carrying sheet	1	1		
Hot water bottles with covers	2	2		
Bed pan with plastic cover	1	1		
Urine bottle	1	1		
Bowls (kidney or round)	2	2	1	
Vomit bags	12	12	6	6
Feeding cup	1	1		
Drinking water receptacle with disposable beakers	1	1		
Fixtures for infusion apparatus capable of taking the range of bottle sizes	2	2		
Bag and mask resuscitator with set of Guedel type airways	1			
Oxygen cylinder and associated equipment	1			
Suction apparatus	1			
Set of splints	1			
Waterproof sheets	2	2		

	Scale A	Scale B	Scale C	Scale D
Burns sheets	2			
Hand lamps	2	2	1	1
Maternity pack	1			
Maternity blankets	2			
Manifold stretcher harness	1			
Golves (disposable)	6 pairs			
Insulated gloves	1 pair			
Dispenser for disposable paper tissues	1	1		
Disposable bags for waste	3	3		
Deodorant spray	1	1		
ø Rescue equipment	one set			
First aid satchels (one per member of crew)	2	2	1 or 2	1
Dressings case	1			

ø See paragraph 44 and Appendix D.

APPENDIX C

CONTENTS OF FIRST AID SATCHELS AND DRESSINGS CASE

We recommend that each ambulance man should be provided with a first aid satchel. In addition, each ambulance should carry a dressings case to supplement the first aid equipment carried in the satchels. The contents of these should be as follows:—

Item	Quantities	
	First Aid Satchel	Dressings Case
Triangular bandages	6	12
Roller bandages 3 in.	6	12
Cotton wool, 1 oz. packets	2	4
Cotton wool, 4 oz. packets	–	2
Prepacked sterilised dressings, medium (4″ x 6″)	4	12
Prepacked sterilised dressings, large (6″ x 8″)	4	12
Prepacked sterilised dressings, very large (8″ x 10″)	1	6
Scissors (on lanyard)	1	1
Safety pins, supply of	1	2
Plaster, zinc oxide, adhesive, 1 in. rolls	1	1
Adhesive dressings, assorted	–	1
Airway, (Brook type)*	1	–
Insulated gloves (see paragraph 33)	1 pair	–
Clinical report cards ø	1 pad	–

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*At the discretion of the ambulance authority (see paragraph 23).

ø For reporting the state of the patient and the attention which has been given.

APPENDIX D

RESCUE EQUIPMENT

	Bolt cutters		1
	Hacksaw		1
	Hacksaw blades (of high speed steel)		6
	Small crowbar		1
	Guide lines		2 x 4 yards
	Warning triangles for placing on road to warn traffic—B.S. AU47: 1965		2
	Fluorescent jackets		2
	Debris gloves		1 pair
ø	Fire extinguisher		1
	Pliers, side cutting, 8″	These should be insulated	1
	Screw driver, 8″		1
	Spanner adjustable, 9″		1

ø These are primarily items of vehicle equipment but may also be required for rescue work.

APPENDIX E

STANDARD SETS OF EQUIPMENT FOR MAJOR ACCIDENTS

Part I-General

12	First aid satchels the contents of which should be standard with those carried on all ambulance vehicles. (See Appendix C.)
1	Portable "Walkie-Talkie" radio set.
20	Stretchers (Furley type)
60	Blankets
72	Blanket pins
6	Burns sheets
6	Polythene bags, 72″ x 24″ for blanket storage
6	Signs ("Ambulance Loading Point") ("Ambulance Parking Point") ("Casualty Collecting Centre") ("First Aid Supplies") ("Stretcher Bearers") ("Ambulance Control")
1	Neil-Robertson stretcher
6	Powerful hand lamps
1	Spot light and 12 volt battery
1	Wood saw
1	7 lb. hammer
1	Crow bar (heavy duty)
20	Stretcher carrying slings
2	Spades
40	Fog flares
20	Fog flare holders
200	Casualty labels
6	Helmets with built-in lamps (miner's type)
6 pairs	Debris gloves
	Reserve oxygen cylinders equal to 200 gallons of gas
1	Standard pack of dressings the contents of which are set out in Part II of this Appendix.

Part II-Standard packs of dressings

144	Triangular bandages
144	Roller bandages 3 in.
48	1 oz. packets cotton wool
24	4 oz. packets cotton wool
144	Prepacked sterilised dressings, medium (4″ x 6″)
144	Prepacked sterilised dressings, large (6″ x 8″)
72	Prepacked sterilised dressings, very large (8″ x 10″)
24	Cards of safety pins, 6 per card
12	Rolls 1″ zinc oxide, adhesive plaster.

APPENDIX F

EQUIPMENT FOR RAIL AND AIR JOURNEYS

		Stretcher Case	*Sitting Case*
(i)	Railway type stretcher	1	–
(ii)	Rubber bed	1	–
(iii)	Blankets	3	–
(iv)	Pillow	1	–
(v)	Hot water bottle with cover	1	–
(vi)	Bed pan, with plastic cover	1	1
(vii)	Urine bottle	1	1
(viii)	Vomit bags	6	6
(ix)	Feeding cup	1	–
(x)	Box of tissues	1	1
*(xi)	Toilet roll	1	1
*(xii)	Vacuum flask	1	1
*(xiii)	Soap, face cloth and hand towel	1	1
	Holdall for returning by rail items (i)–(iv) (if storage for these items is not provided as part of the stretcher)	1	–
	Travelling case for attendant to carry items (v)–(xiii)	1	1

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*These items should be carried as additional equipment on ambulances for long journeys by road.

APPENDIX G

ITEMS OF PERSONAL CLOTHING AND EQUIPMENT

Cap	1
Jackets	2
Summer jackets	1
*Trousers	2
Shoes	2 pairs
Driving gloves	1 pair
Mackintosh, with detachable lining	1
Shirts	3
Collars	6
Ties	2
*Socks	3 pairs
Overalls	Station issue
Gum boots	Station issue
First aid dressing	1
Clinical thermometer	1
Blanket pins	6

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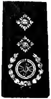
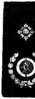
*Appropriate feminine clothing should be issued as necessary.

APPENDIX H

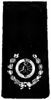
INSIGNIA



CHIEF AMBULANCE OFFICER

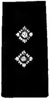


DEPUTY AMBULANCE OFFICER

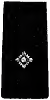


ASSISTANT AMBULANCE OFFICER

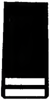
SUPERINTENDENT



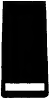
DEPUTY SUPERINTENDENT



STATION OFFICER



DEPUTY STATION OFFICER OR SHIFT LEADER



LEADING AMBULANCE MAN

APPENDIX I

OUTLINE SPECIFICATION FOR TYPE I AND TYPE II AMBULANCE

1. An ambulance should be a simple and reliable vehicle, easy to drive and maintain. It should have adequate space for the treatment and nursing of patients during the journey and for storage of the equipment necessary for these functions. It should be safe and manoeuvrable in modern traffic conditions and so constructed as to encourage the highest standards of cleanliness.

2. The specific data given below were supported by much of the evidence we received and the answers to the questionnaire which we sent to ambulance authorities. These answers also contain much information on points of detail (such as ancillary equipment for vehicles, body materials and construction, design of windows, doors, rear steps, etc.,) which may be of value as the project we recommend develops. This material is in the possession of the Ministry of Health.

Ambulance (Type I Chassis)

3. A special chassis for Type I ambulances should include the following:—

(*a*) *Wheelbase*
This should be long enough to allow a patient to lie entirely between the axles and to minimise pitch. Current experience points to a length of approximately 10 ′ 3 ″. Rear wheels should be set as far back to the rear of the chassis frame as possible to minimise inconvenience from wheel arches.

(*b*) *Turning Circle*
Not more than 40 ′.

(*c*) *Engine*
Smooth running and adequate power are highly important and the power output should be related to gross weight of the finished vehicle. It should be a petrol engine since, after many years of experience with both petrol and diesel power units, authorities are almost unanimous in their preference for petrol.

(*d*) *Drive*
Front wheel drive, by eliminating the transmission to the rear wheels, enables a vehicle to be designed with a lower centre of gravity, thus reducing the effects of pitch and roll, and with a lower floor making for easier loading. There would be a need for trials of front wheel traction.

(*e*) *Suspension*
Independent on all wheels and designed so as to provide a comfortable ride under all conditions of loading.

(*f*) *Brakes*
Fitted with pressure limiting device to provide even braking over the whole of the braking distance and to reduce the risk of skidding.

(*g*) *Fuel tank*
To hold sufficient petrol for 200 miles.

(*h*) *Road wheels*
14" wheels.

(*i*) *Driving position and cab*
Forward, or semi-forward, with ease of access for crew.

(*j*) *Transmission*
Fully automatic or semi-automatic gearbox to reduce driving fatigue and give a smoother ride.

Dual purpose ambulance (Type II chassis)

4. The outline requirements given in paragraph 3 above would be suitable, subject to modifications because of the heavier loads to be carried. A self-levelling device should be incorporated.

Ambulance body

5. If an improved chassis were available the design of an ambulance body would present no special problems. But a greater degree of standardisation in the design of the body is desirable to ensure that the benefits of an improved chassis are not lost by the use of unsuitable bodies, to facilitate a more standard system of training and operational procedures and to establish an accepted norm from which further improvements might be evolved. If a special chassis is developed, a special body should therefore also be designed which should include the following features:—

(*a*) *Stretcher and seating accommodation*
Two stretcher trolleys, which, on the Type II chassis, should be adaptable to provide 8 seats. Tip-up seat for attendant.

(*b*) *Internal dimensions*
The minimum length should be 9' 6"; the minimum width should be 6' 0" and the height should be approximately 5' 8". Stretcher/seating accommodation should be arranged to ensure a central gangway of at least 1' 11".

(*c*) *Central rear door*
This should be no bigger than is necessary to carry in the patient or wheel in the ambulance trolley, so as to preserve heat and privacy and strengthen the construction of the vehicle. This would require a door width of approximately 3' 0".

(*d*) *Intercommunicating door*
There should be a sliding door to allow communication between the driver's cab and the ambulance compartment to the rear.

(*e*) *Side door*
The side door (which would also serve as the near side cab door) should give easy access to the rear of the ambulance, thus permitting kerb-side loading for walking patients.

(*f*) *Outside locker*

There should be an outside locker to accommodate rescue tools which are never required inside the ambulance (see paragraph 44).

(*g*) *Portable incubator terminals*

Terminals or sockets for connecting premature baby incubators to the vehicle battery circuit should be incorporated. These should be in the same position in every ambulance and should be of a standard design to prevent the incubator from being connected to the wrong source of supply.

(*h*) *Warning devices*

Standard two-tone horns and blue flashing lights should be fitted and a device to enable all flashing direction indicators to be operated simultaneously when the ambulance is stationary at an incident.

(*i*) *Colour*

We consider that it is important that all ambulances should have the same outside colour and we recommend white.

(The great majority of authorities advocate a standard colour scheme and most of them suggest white or some very light colour).

The interior decoration should be in a restful colour.

(*j*) *Internal stowage accommodation*

This should be specifically designed to accommodate the equipment recommended and there should be a standard lay-out for all ambulances.

(*k*) *Safety precautions*

Guidance on safety precautions is contained in Circular 16/62 issued by the Ministry of Health. In addition, ambulance crew and forward facing passengers should be provided with seat belts, and the possibility of providing similarly for sideways facing passengers should be investigated.

APPENDIX J

DIGEST OF INFORMATION RECEIVED FROM AUTHORITIES ON AMBULANCE EQUIPMENT AND VEHICLES

1. Questionnaires were sent to each local health authority, the Greater London Council and the Scottish Ambulance Service and the information received is set out briefly below. Returns were furnished by 135 authorities in respect of equipment and 136 authorities for vehicles.

Vehicles

2. The returns disclosed that 48% of vehicles are fully equipped to carry emergency patients, while a further 18% are designed to carry them but have a reduced scale of equipment because they normally do not carry them. 26% of vehicles are primarily designed for sitting cases but are able to take at least one recumbent patient (although rarely so used). The remaining 8% only provide accommodation for sitting cases.

3. Twenty-five authorities are using light ambulances of the limousine type: 70 of these vehicles, of various makes, are in use.

4. Of the 136 authorities, 101 indicated that their ambulances are coloured white, ivory or cream.

Stretchers and stretcher gear

5. There are three main types of general purpose stretcher in use in the ambulance service—proprietory outside loading, Furley, and pole and canvas—and there are also eleven other types of general purpose stretcher. The table below shows the number of authorities carrying each of the main types and the number of authorities carrying respectively one type, various combinations of two types and various combinations of three types on ambulances used for emergency patients:—

	Proprietory outside loading	*Furley*	*Pole and Canvas*	*Others*
One type only (36 *authorities*)	12	15	5	4
Variations of two types (68 *authorities*)	49	49		
	6		6	
	2			2
		9	9	
		2		2
Variations of three types (31 *authorities*)	28	28	28	
	1		1	1
	2	2		2
(135 *authorities*)	100	105	49	11

6. 76 authorities carry two stretchers on ambulances used for emergency patients and 30 carry three; of the remaining 29 authorities 8 carry only one stretcher and 21 carry from four to eight stretchers per ambulance.

7. If ambulances used other than for emergency patients are included the variety of practice becomes even greater, there being over 60 kinds of provision made.

8. Many authorities also hold stretchers for special purposes, such as rescue work, railway journeys and special injuries; these are mainly stored in readiness at selected ambulance stations. The most widely used is the Neil-Robertson stretcher (74 authorities).

9. 25 authorities use stretcher trolleys.

Bedding

10. 126 authorities use mattresses, mainly of the foam rubber type. Most authorities carry only one in each vehicle used for emergency patients and only 18 authorities carry mattresses on their dual purpose sitting case vehicles. Most authorities carry 3 blankets and a pillow for each stretcher. Only 10 authorities provide bed sheets.

Carrying chairs and sheets

11. All except one authority provide one carrying chair in vehicles used for emergency patients but only half the authorities provide one in the dual purpose sitting case vehicles. Most authorities also carry at least one carrying sheet in vehicles used for emergency patients and a few carry them in their dual purpose sitting case vehicles.

Hot water bottles and electric blankets

12. Only 5 authorities provide electric blankets but most authorities carry at least one hot water bottle in the vehicles used for emergency patients.

Hygiene equipment

13. Practically all vehicles used for emergency patients carry a bed pan, a urine bottle and a kidney bowl but the majority of dual purpose sitting case vehicles do not do so.

Drinking water receptacles

14. Authorities normally provide drinking water facilities on all vehicles except those used exclusively for sitting cases.

Infusion apparatus

15. The majority of the vehicles used for emergency patients have one fixture for taking an infusion bottle, and so have about half of the dual purpose ambulances (Type II) not normally used for emergency patients.

Oxygen apparatus

16. All but one authority provide oxygen equipment of some sort; 107 authorities carry it on their vehicles used for emergency patients. The remaining 27 authorities do not carry it at all times but hold it available in case of need. 22 different types of equipment are in use; 33 authorities use one type only, the majority use two types and two authorities use as many as five types.

Airways and bellows

17. 106 authorities use airways of the Brook or similar type, the majority of them carrying some for each vehicle used for emergency patients, and several carrying them on other vehicles. Only 33 authorities regularly carry bellows for positive pressure resuscitation, mostly on vehicles used for emergency patients, although a further 25 authorities have them available at stations, etc. Eight different types are in use, most authorities using only one type, although four authorities use two types and one authority uses three.

Suction apparatus (aspirators)

18. Suction apparatus is carried on all vehicles used for emergency patients by 27 authorities; a further 48 authorities carry it on some vehicles or have it available for use, whereas 60 authorities do not use it at all. Twelve different types are in use, most authorities using only one type. 69 authorities have only portable types, 5 have only fixed types and one has both on its vehicles.

Splints

19. All but 9 authorities carry sets of splints on their vehicles used for emergency patients and a number of authorities carry them also on their dual purpose vehicles. The number of splints per set varies widely between 1 and 30. Some 25 types of splint are in use although most authorities use wood slats. 26 authorities are using inflatable splints. 45 authorities use two kinds of splint and 13 authorities use more than two kinds.

Waterproof sheets

20. Most authorities carry at least one waterproof sheet on vehicles other than vehicles used primarily for sitting case patients but only a few sitting case vehicles carry them.

Burns sheets

21. Only a small proportion of vehicles carry burns sheets.

Hand lamps

22. Several authorities provide hand lamps on their vehicles, particularly on those used for emergency patients. The other authorities hold them in store for issue as necessary.

Manifold harness

23. Only six authorities equip their vehicles used for emergency patients with manifold harness and two others hold it in store.

Gloves

24. A few authorities provide disposable plastic gloves and 29 authorities provide insulated gloves on their vehicles used for emergency patients.

Light rescue equipment

25. Light rescue equipment is carried on vehicles used for emergency patients by 24 authorities and 5 authorities have it available at stations, etc., in case of need.

First aid satchels

26. Less than half the authorities provide satchels for each member of the crew of an ambulance, and then not normally on a personal basis.

Dressings case

27. Most authorities equip their vehicles used for emergency patients with a dressings case, and they are provided fairly often on other vehicles also.

Maternity packs

28. About half the authorities provide maternity packs on their vehicles used for emergency patients and on those of their dual purpose ambulances (Type II) not normally used for emergency patients and some provide these on their dual purpose sitting case vehicles.

Toilet requisites

29. Only a few authorities provide a waste bin in their vehicles, and a minority provide paper towels and deodorant sprays.

Poison antidotes

30. These are carried by two authorities.

Pain-relieving drugs

31. These are carried by three authorities and a further 12 authorities have them available for use when needed. (Information on the use of drugs received from the five authorities whose vehicles either carry them or have carried them in the recent past show that they have been rarely used: sixteen times a year by the former London County Council ambulance service; four times a year by the former Middlesex Service; about six times a year by Huntingdonshire and Peterborough; two to three times a year by Lancashire; twice in five years by Cardiganshire).

Surgical instruments

32. Nine authorities hold these in store. In the main they are kept in packs for use at major disasters.

Other items

33. A wide variety of other items of equipment are carried, some by many authorities, in other cases just by one or two. Items provided by a fairly large number of authorities include feeding cups, fracture boards, stretcher covers, washing bowls, ground sheets and sand bags. At the other end of the scale only one authority carries such items as plastic aprons, carrying slings, rugs, sponge bags, surgical spirit and a built in water supply other than for drinking.

Uniform and personal equipment

34. Most authorities make an initial issue of uniform comprising one cap, one jacket, two pairs of trousers, and a mackintosh. About half the authorities also issue summer jackets. The majority do not provide staff with shoes, socks and gloves. Most authorities provide shirts, collars and ties but the scale of issue and replacement varies considerably. Overalls and gum boots are not usually issued on a personal basis but most authorities provide them as a station issue.

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